MT1st5 group, and post-surgery in SC and IF1st5 groups. None had post-surgery complications related to the systemic inflammatory response.

These data support a pragmatic approach in timing definitive fracture surgery based upon the patient's clinical improvement following damage control. There appears to be no associated detrimental effect upon the systemic inflammatory response, even when undertaken less than 5 days from admission and DCS.

doi:10.1016/j.injury.2009.06.244

**6A.9**

## Transfer times and outcome for patients with extradural haematoma in the East Midlands

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*Introduction*: There are few studies examining the most effective model of neurotrauma care in traumatic brain injury (TBI). Direct admission to a neurosurgical unit (NSU) may improve outcome through expert neurocritical care and rapid evacuation of intracranial haematomas. However bypass of district general hospitals (DGHs), with longer time from injury to initial assessment and stabilisation may be deleterious. Extradural haematomas (EDH) comprise a subset of TBI where early surgical intervention has been shown to improve outcome. We have examined the relationship between EDH patients admitted directly to a NSU compared to those initially admitted to a DGH before transfer to the NSU for definitive care.
*Methods*: Patients admitted to the Queens Medical Centre between 1993 and 2002 with TBI and Glasgow Coma Score of <12 were included prospectively in the Nottingham Head Injury Register. Clinical data including transfer times were recorded prospectively. Following admission a standard head injury management protocol was followed. Glasgow Outcome Scale (GOS) was calculated at one year. A favourable outcome was defined as GOS 4 and 5 and an unfavourable outcome as GOS 1, 2 and 3. We examined the relationship between direct admission to a NSU, and both patient outcome at 1 year and transfer time.
*Results*: Data were available on 94 patients, as shown in Table 1. Case-mix was similar between study groups. Relative risk of unfavourable outcome in the referred group was 1.05 (95 % CI 0.66–1.76). The length of time from injury to neurosurgery was significantly shorter in the directly admitted patients compared to the referred patients (median time 220 v338 min, $p < 0.01$).
*Conclusion*: There was no significant difference in outcome between EDH patients admitted directly to a NSU and those transferred from a DGH, despite prolonged time to neurosurgery.
*Questions*: Paragraph headings

- References
- GOS
- Case-mix

**Table 1**

| | Unfavourable outcome | Favourable outcome | Total |
|---|---|---|---|
| Referred from DGH | 26 | 34 | 60 |
| Direct admission | 14 | 20 | 34 |
| Total | 40 | 54 | 94 |

doi:10.1016/j.injury.2009.06.245

**6B.1**

6B: Polytrauma

## Early detection of life threatening intracranial haemorrhage using a portable near infrared spectroscopy device

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*Introduction*: Head injuries are common, mostly occurring following road traffic accidents and falls. As many as 15% of trauma victims with head injury evaluated in emergency departments will be found to suffer from intracranial bleeding and 3% will be in need of immediate neurosurgical intervention. Early identification of significant intracranial haemorrhage is crucial in the treatment of multitrauma patients and may have a considerable impact on the treatment plan.
*Hypothesis*: Infrared spectroscopy allows early recognition of epidural and subdural haematomas in trauma patients.
*Methods*: The work was performed as prospective multi-centre observational study. Investigators participating in this study underwent training on proper operation of a portable near infrared spectroscopy device (Crainscan, Odicrain GmbH, Hannover, Germany). Injured patients admitted to two trauma units, who underwent computer tomography (CT) of the head as a part of their initial evaluation, were enrolled. Infrared spectroscopy was performed on each patient before transfer to CT. CT findings suggestive of epidural and subdural haematoma served as control.
*Results*: 110 patients were enrolled over a period of 12 months. Sixty-four (58.1%) were male and 46 (41.9%) were female. Mean age was 56.2 years and mean Glasgow Coma Scale on admission was 12.6. Infrared spectroscopy was 90.5% sensitive and 95.5% specific. Positive Predictive Value and Negative Predictive Value were 82.6% and 97.7%, respectively.
*Discussion*: Infrared spectroscopy allows rapid and reliable detection of both epidural and subdural haematomas in trauma patients. It requires minimal training. Its portability allows NIRS to be done wherever is convenient within the medical facility. It can also be used in the prehospital treatment of injured victims.

Further studies are needed to evaluate whether immediate confirmation or exclusion of epidural and subdural haematomas with portable near infrared spectroscopy devices improve the decision-making process in the treatment of severely injured patients.
*Keywords*: Near infrared spectroscopy; Intracranial bleeding; Epidural haematoma; Subdural haematoma

doi:10.1016/j.injury.2009.06.246